

Photosynthesis Lab

Pre-Lab Information & Analysis:

Review the lab handout and respond to the following questions on separate paper for submission on lab day.

1. Summarize how the general procedures of this lab will allow you to measure the rate of photosynthesis.
2. On p. S67, step 8 discusses a point called ET_{50} . What is this value?
3. Use the definition of ET_{50} to explain WHY when graphing this against rate of photosynthesis, it gives a negative slope. View the graph in figure 8a, p. S69 very carefully to understand this relationship and SEE ME IF YOU DON'T UNDERSTAND IT as this will be a major point to master for your lab analysis.
4. We will test light intensity as a variable in this experiment. Summarize how the data will be analyzed.

Procedures:

***** The following steps must be completed with the lamp base 1cm away from the beaker and 10cm away.** Each group has 2 lamps, divide tasks accordingly so you complete the data collection within the class period.

1. Fill an empty beaker with 90 mL tap water.
2. Prepare lamp setup: Position lamp on the table so that the edge of the lamp will be the selected distance away from the beaker with water. Turn on the lamp to warm up.
3. Punch out 10 leaf disks with the hole-puncher.
4. Saturate the leaves with bicarbonate solution and get them to sink using plunger method. I will have all the bicarbonate/soap solutions prepared for you at your table.
5. Dump saturated leaves into the tap water beaker, **start a timer**, and then bring water level up to 100mL with additional tap water. Record the time taken for the 5th & 6th leaves to reach the surface. Calculate the average and input this value in for the ET_{50} in the data table. If leaves are not floating within 10 minutes, try again with another leaf sample.
6. **When finished all trials**, dump solutions in drains and rinse off/dry all materials.
7. Record data for all groups in class & calculate class average.

Results:

Table 1: ET₅₀ values for groups and class averages at 3 different lamp distances.

	1cm	10cm
Group 1 ET ₅₀		
Group 2 ET ₅₀		
Group 3 ET ₅₀		
Group 4 ET ₅₀		
Group 5 ET ₅₀		
Class average data ET ₅₀		

SD = _____ SD = _____

Photosynthesis Lab Report Guidelines

Title – Specific to the variable we manipulated in class.

Introduction – Follow general guidelines on report guide for introduction. State the null hypothesis & how it meets the purpose of the experiment.

Methods – Outline steps as appropriate; be sure to include materials & procedures in past tense.

Results – Include your **data table** of all the quantitative data above. Include the **SD** for each distance. Construct a **figure** to show ET₅₀ as a function of lamp distance (light intensity) including ± 1 SD error bars from your SD calculations. Make sure all tables/figures have proper titles, labeled axes & correct units.

Analysis: Perform a t-test using the website:

http://www.physics.csbsju.edu/stats/t-test_bulk_form.html.

Be sure to put in each group's values (EXCLUDING THE AVERAGE) for 1cm in the first box and each group's values for 10cm in the second box. Explain why the results occurred the way they did in terms of photosynthesis reaction requirements and why there was/was not a significant difference for the distance variable, making note of the error bars in your graph & p-value from the t-test.

Conclusions: Follow general guidelines on report guide.